

REMARKS

Claims 1-8 are pending. By this response, claims 1, 4 and 5 are amended and claims 6-8 added. Reconsideration and allowance based on the above amendments and following remarks are respectfully requested.

Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe (US 6,522,356) in view of Taniji (US 5,485,204). This rejection is respectfully traversed.

In embodiments of the present invention a plurality of horizontal transfer electrodes are provided on a horizontal transfer path. A mix controller controls the application of the horizontal transfer pulses to the horizontal transfer electrode so as to change the horizontal transfer electrodes in order to control the mixing of the signal charges and the amount of the mixed signal charges. In embodiments of the present invention, the amount of the signal charges to be transferred by one horizontal transfer pulse is controlled so that transfer speed of the horizontally transferred signal charges can be changed and the brightness of the pixel of an image which is represented by the mixed signal charges can be adjusted.

In contrast, Watanabe teaches a color solid state imaging apparatus. The apparatus includes a photoelectric conversion section having a matrix of pixels for each color element red, green and blue (RGB). The R, G, B elements are arranged in alternating columns of green and a column of alternating red and blue. Each column is connected to a horizontal drive line 3 which connects to the horizontal signal line 7. Each column is sequentially read and transferred to the horizontal signal line. Watanabe also teaches that signals can be read from a vertical drive line 2 connected to a vertical scanning circuit 4.

Embodiments of Watanabe use a single horizontal signal line 7 where two or more horizontal signal lines for example, lines 7a and 7b as illustrated in Fig. 9. From the single horizontal signal line data is read sequentially from each column. See column 8, lines 1-42. In the double horizontal signal line, the green elements are read onto a line while the red and blue elements are read onto a second line different from the green elements. For example, see column 8, lines 45 through column 9, lines 37. Watanabe's apparatus does not teach or suggest, *inter alia*, said horizontal transfer path is provided with a plurality of horizontal transfer electrodes; said solid-state electronic imaging device further comprising a mix control that applies horizontal transfer pulses to plural horizontal transfer electrodes of said horizontal transfer electrodes and changes the horizontal transfer electrodes to which said horizontal transfer pulses are applied in order to control mixing of the signal charges and an amount of the mixed signal charges, as recited in claim 1; and said horizontal transfer path is provided with a plurality of horizontal transfer electrodes; and applying horizontal transfer pulses to plural horizontal transfer electrodes of said horizontal transfer electrodes and changing the horizontal transfer electrodes to which said horizontal transfer pulses are applied in order to control the mixing of the signal charges and an amount of the mixed signal charges, as recited in claims 4 and 5.

Further Watanabe does not teach or suggest, wherein every three adjacent signal charges from the row of signal charges inputted to the horizontal transfer path are mixed in the horizontal transfer path, as recited in claims 6-8.

The Office Action relies upon Taniji to provide the teachings of mixing signals in the horizontal transfer path absent in Watanabe. Taniji teaches having columns of green (G)

followed by columns of red/blue (R/B). The photodiodes of the R/B are not alternating red and blue, but each photodiode can be representative of red or blue.

Taniji teaches a method of summing the charges of adjacent photodiodes in adjacent columns. The summing is carried out in the horizontal transfer register 12. The summing concerns “adding” the charges of the two of the photodiodes 11 aligned in a matrix.” See column 1, lines 29-33. Thus, the summing is performed for only the two adjacent signals inputted in the horizontal transfer registers 12.

Applicants respectfully submit that Taniji fails to teach or suggest the above features of independent claims 1, 4 and 5 deficient in Watanabe’s teaching. Further, applicants respectfully submit that Taniji fails to teach every three adjacent signal charges from the row of signal charges inputted to the horizontal transfer path are mixed in the horizontal transfer path, as recited in independent claims 6-8. At best Taniji teaches adding of two adjacent signal charges in the horizontal transfer register, nothing more. Therefore, a combination of Watanabe and Taniji fails to teach each and every feature of applicant’s claimed elements.

Further, one of ordinary skill in the art would not look to combine the teachings of Watanabe and Taniji. Taniji’s sensors rely upon the square checkered G, R/B color arrangement which arrangement causes problems and creates error signals occurring when the signals are mixed. Taniji’s design is discussed in applicant’s background section as one of the types of prior art sensors for which applicant’s device is designed to overcome due to the errors caused by these devices.

Watanabe teaches an entirely different system from Taniji in which these columns of green sensors and columns of red and blue sensors are offset from each other. In Watanabe, the

red and blue sensors are alternating in the column. These two designs require different approaches to obtaining the signals from the photodiodes and reading those signals. Nowhere in Watanabe does it teach or suggest modifying its design to include mixing signals in the horizontal transfer path. Further, nowhere in Taniji does it teach or suggest mixing signals in the horizontal transfer path in a photodiode arrangement described in Watanabe. Applicants respectfully submit that one of ordinary skill would not look to combine these teachings as there is no motivation to do so within the references and the unique design differences do not make it obvious to do so.

In view of the above, applicants respectfully submit that the combination of Watanabe and Taniji fail to teach the generic feature of the claims as required. Further, one of ordinary skill in the art would not be motivated to combine those teachings. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Conclusion

For at least these reasons, it is respectfully submitted that claims 1-8 are distinguishable over the cited art. Favorable consideration and prompt allowance are earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Chad J. Billings (Reg. No. 48,917) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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